

**NORTH CAROLINA OCCUPATIONAL SAFETY AND HEALTH
EDUCATION AND RESEARCH CENTER**

**SUMMARY ANNUAL REPORT
July 1, 2011 - June 30, 2012**

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Submitted By:

**Bonnie Rogers
Center Director
University of North Carolina at Chapel Hill
Chapel Hill, North Carolina**

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SECTION I: NC OSHERC Summary and Relevance, & Current Contact Information

■ ERC Summary

The North Carolina Occupational Safety and Health Education and Research Center (NC OSHERC) is located at the University of North Carolina, Gillings School of Global Public Health with collaborating units at North Carolina State University (NCSU) and Duke University. Academic training is provided in the core disciplines of Occupational Health Nursing, Safety and Ergonomics (NCSU), and Occupational Medicine (Duke University). In addition, two allied training programs are provided in Occupational Epidemiology and in Occupational Exposure Science, replacing the former Industrial Hygiene program. There are more than 50 faculty within the NC OSHERC with more than 100 enrolled students each year in these programs. We also offer an extensive Continuing Education (CE) program.

The mission of the NC OSHERC at the University of North Carolina, Chapel Hill is to provide high quality education, research training, and research in the occupational health and safety sciences to protect worker health. Research and multidisciplinary interactions are the foundation of this process.

Education: Train occupational health and safety professionals to acquire an expanded knowledge base, provide occupational health and safety services, and develop research skills.

Research: Define and develop the discipline of the occupational health and safety sciences to reduce work-related health hazards and improve worker health and working conditions. The purpose of the program is to:

1. Train practitioners and researchers in the academic disciplines of occupational medicine, occupational health nursing, safety/ergonomics, occupational epidemiology, and occupational exposure science in the field of occupational health and safety.
2. Provide interdisciplinary learning experiences through coursework, field projects, and seminars.
3. Provide a continuing education training program to meet the needs of practitioners and those interested in occupational safety and health.

The programs are offered at the master's and doctoral level in the different academic disciplines, or post-doctoral level in medicine. Training activities include coursework, practica seminars, field projects, and research activities, many which are interdisciplinary in nature. The OHN Program offers both residential and distance education learning options.

A variety of individual CE interdisciplinary courses are offered on-site, on contract basis, or through the week-long Summer and Winter Institutes. In addition to the continuing education, seminars with topics relevant to education, research, and practice in all disciplines are offered quarterly through the NORA (National Occupational Research Agenda) Interdisciplinary Seminar Series. Interdisciplinary collaboration is a key component of the NC OSHERC among faculty, students, and community partners engaging in joint projects to improve worker health and safety. Outreach to the local occupational safety and health community is an integral part of the NC OSHERC.

■ Relevance

This education and research program is designed to prepare practitioners and researchers in occupational health and safety. These professionals work to protect and promote the health and safety of our nation's workforce. Education and research in occupational health and safety is essential to eliminate these hazards and make the workplace safer and healthier for all workers.

■ Key Personnel

Name	Role in NC OSHERC	Contact Information
Bonnie Rogers, DrPH, COHN-S, LNCC, FAAN	Principal Investigator (PI) Center Director	UNC, SPH 1700 Airport Road CB #7502 Chapel Hill, NC 27599-7502 919-966-1765 rogersb@email.unc.edu
Susan Randolph, MSN, COHN-S, FAAOHN	Center Deputy Director	UNC, SPH 1700 Airport Road CB #7502 Chapel Hill, NC 27599-7502 919-966-0979 susan.randolph@unc.edu

Name	Role in NC OSHERC	Contact Information
David Kaber , PhD, CHFP	Director, Occupational Safety and Ergonomics Program	NCSU Dept. of Industrial and Systems Engineering 111 Lampe Drive Raleigh, NC 27695-7906 919-515-0312 dkaber@ncsu.edu
Dennis Darcey , MD, MSPH, FACOEM	Director, Occupational Medicine Program	Duke University 2200 W. Main Street Box 3834 Durham, NC 27710 919-684-3591 dennis.darcey@duke.edu
Bonnie Rogers , DrPH, COHN-S, LNCC, FAAN	Director, Occupational Health Nursing Program	UNC, SPH 1700 Airport Road CB #7502 Chapel Hill, NC 27599-7502 919-966-1765 rogersb@email.unc.edu
David Richardson , PhD	Director, Occupational Epidemiology Program	UNC, SPH 135 Dauer Drive 2102b McGavran-Greenberg CB #7435 Chapel Hill, NC 27599-7435 919-966-2675 david.richardson@unc.edu
Leena Nylander-French , PhD	Director, Occupational Exposure Science Program	UNC, SPH 135 Dauer Drive 159 Rosenau Hall CB #7431 Chapel Hill, NC 27599-7431 919-966-3826 leena_french@unc.edu
Kathleen Buckheit , MPH, COHN-S/CM/SM, FAAOHN	Director, Continuing Education	UNC, SPH 1700 Airport Road, STE 344 Chapel Hill, NC 27514 919-842-3609 buckheit@email.unc.edu

- **NC OSHER Web Link**
<http://osherc.sph.unc.edu>

SECTION II: Program Highlights of High Impact Outcomes

▪ Overall NC OSHERC

Outreach efforts remain outstanding by all faculty with high participation in the community and continued translation of research to practice via numerous publications, presentations, collaborative sponsorship of courses, and consultations. The NORA (National Occupational Research Agenda) Interdisciplinary Seminars, which are offered quarterly live on-campus and online, continue to draw high interest among students and occupational health and safety colleagues worldwide. Over 500 people participated in the seminars this past year; topics and speakers included: “Integrated Approaches that Promote Healthy Workers and Healthy Workplaces” by Laura Linnan, ScD; “America’s Health Rankings and Occupational Safety and Health” by Anna Schenck, PhD; “Arsenic and the Epigenome” by Rebecca Fry, PhD; and “Standard/Universal Precautions: Is it Time to Evaluate?” by Kathy Kirkland, DrPH. The archive link enables students to attend the required seminars and allows colleagues from around the globe to participate at their convenience regardless of time zone. Other interdisciplinary efforts occur in numerous courses

including PUBH 785 (Interdisciplinary Approaches to Occupational Health); ENVR/PHNU 423 (Industrial Toxicology); ENVR 432/PHNU 786 (Occupational Safety and Ergonomics); and PHNU 787 (Industrial Hygiene).

The NC OSHERC Newsletter (News-E) is distributed to over 20,000 members of the occupational health and safety community. It includes information about each ERC program area, student and graduate accomplishments, and pertinent information about occupational health and safety. We also provide the OEM Listserv wherein occupational safety and health professionals discuss and debate current and emerging issues in the field. The listserv has a membership of about 4,000 individuals in nearly 100 countries.

Outcomes from the three Pilot Projects funded last year included manuscripts submitted for publication, presentations at conferences, and research awards to continue the work initially funded by the NC OSHERC pilot study. For this year, eight Pilot Project applications were received with three selected for funding. The funded projects are: (1) "Persistence of and Risk Factors for MRSA and MDRSA Nasal Carriage among Industrial Livestock Workers and Household Members" by Jessica Rinsky (UNC Epidemiology doctoral student); (2) "Influence of Epigenetic Alterations on Biomarker Levels" by Rebecca Fry and Leena Nylander-French (faculty in UNC Occupational Exposure Sciences); and (3) "A Study of the Perception of Risk Associated with Extension Ladder Falls" by Will Heath (NCSU master's student in Safety/Ergonomics with Dr. Kaber).

- **Occupational Safety and Ergonomics (David Kaber, PhD, CHFP)**

The major accomplishments for the Occupational Safety & Ergonomics (OSE) Program have included trainee graduations, journal and conference proceeding publications, and student and faculty sponsored research projects. Two NIOSH trainees and one OSE Program masters student graduated with master's degrees in fall 2011 or summer 2012. These students prepared theses on musculoskeletal disorders of veterinarians (M. Rogers), perceived risk of extension ladder (W. Heath), and usability of laptop touchpad texturing (S. Suresh). In addition, a coursework-only masters student (A. Singh) graduated and took a position as a Usability Analyst at Computer Associates. Beyond this, two OSE Program doctoral students (Y. Zhang and B. Zhu) completed dissertations on driver distraction research and human motor skill learning. These students also graduated in fall 2011. Among all these research projects two involved interaction with external organizations, including the NC State Veterinary School and Lenovo Corporation. There are currently three NIOSH trainees in the OSE Program including two masters students (B. Corbett and C. Pankok) and one Ph.D. student (M. Clamann). They are pursuing research on: a haptically-enhanced computer-based learning system; cockpit displays of traffic information and pilot's decision making; and haptic features in virtual reality-based simulations for motor skill training. With respect to faculty accomplishments, Dr. David Kaber was elected Fellow of the *Human Factors and Ergonomics Society* in September 2011 and served as the Chair of the Council of Technical Groups for the Society through 2012. Dr. Kaber also received a grant from the NC Department of Transportation for studying driver usage of roadway signs under complex traffic conditions. Dr. Chang S. Nam also received a grant from the Rehabilitation Engineering Center for study of brain-computer interface (BCI)-driven orthoses. Through the direction of Drs. Nam and Kaber, NIOSH trainees published six journal articles and nine conference proceeding papers. Regarding course instruction, Dr. Nancy Currie joined the OSE faculty from NASA Johnson Space Center as a Visiting Associate Professor.

The major impacts of the OSE Program have primarily occurred through the NC State Engineering On-line Program and participation of the Human Factors & Ergonomics (HFE) Area Laboratories in hosting tours. In spring 2012, Drs. Nam and Kaber delivered Human Factors in Systems Design (ISE/PSY 540) and Occupational Safety Engineering (ISE 541) as on-campus and on-line courses. Dr. Currie is currently teaching the Systems Safety Engineering (ISE 741) to both on-campus and on-line sections (fall 2012). During the reporting year, the Ergonomics Lab hosted eight tours for faculty from international universities interested in research collaboration, faculty candidates seeking positions in other engineering departments, students in training classes offered by the Ergonomics Center of North Carolina, prospective undergraduate students and parents as part of the College of Engineering Open House, and Armed Forces students participating in a research training class. Beyond these impacts, one NIOSH trainee worked at NASA Ames as a research intern during Summer 2012. The position involved study of integration of unmanned aerial systems in next generation airspace concepts of operation. Finally, OSE Program faculty gave invited presentations on HFE research as part of the NC State Rehabilitation Engineering Center seminar series and the Psychology Department HFE Brownbag seminar series.

- **Occupational Medicine (Dennis Darcey, MD, MSPH, FACOEM)**

The Duke Occupational and Environmental Medicine Residency Program (OEMR) continues to have a regional impact in DHHS Region IV by training occupational medicine (OM) physicians, providing extensive occupational health education opportunities for practicing occupational health and safety professionals and conducting research

relevant to preventing hazardous occupational and environmental exposures and disease. Some highlights of high impact are listed below.

“Documenting Medicine,” is a program which pairs Duke physician residents and fellows with documentarians at Duke’s Center for Documentary Studies to produce small documentary projects exploring medical stories over the course of nine months. These projects are then shared in Grand Rounds, conferences, poster sessions, exhibits, community educational events and other venues. Films that will be presented at the American Public Health Association meeting in Fall 2012 are:

- OM Resident Thomas Bender’s film illustrates the impact of an outbreak of hepatitis B at an assisted living facility and why the policy changes adopted in North Carolina should be emulated elsewhere. <http://vimeo.com/43288991>
- OM Graduate (June 2012) Dr. Cindy Feltner’s film examines how work culture and local community economics can influence injury reporting by exploring one coal miner’s experience following a work-related injury. <http://vimeo.com/42133350>

In the last year Duke Occupational Medicine faculty and residents provided Continuing Medical Education training in 59 courses for 853 local and regional occupational health professionals in medicine, nursing, safety, and industrial hygiene employed in industry, government and academia in Region IV.

▪ **Occupational Health Nursing (Bonnie Rogers, DrPH, COHN-S, LNCC, FAAN)**

During this reporting period there were 18 trainees enrolled in the OHN MPH program. We also enrolled 5 new students into our academic Certificate OHN Specialist program which is a feeder to the MPH program. Because of the distance learning option, all students remain employed while in school. Students and faculty continue to publish articles in professional peer-reviewed journals. Thirteen articles or manuscripts have been published and included topics on evaluation of the OHN Program through competency achievement, ethics and professionalism in occupational health nursing, the aging worker, occupational health nursing education, etc. Dr. Rogers is currently preparing the third edition of the textbook, *Occupational Health Nursing: Concepts and Practice*, which is used worldwide and has been translated into Portuguese and selected portions in Japanese. Starting January 2012, Susan Randolph was asked to co-author the “Health Updates,” a monthly column in the *AAOHN Journal*.

We have been awarded two contracts to examine respiratory protection among health care workers in a sample of North Carolina hospitals that will impact practice. In addition the projects will focus on identifying interdisciplinary competencies in respiratory protection.

Several students received awards during this past year. Kristin Stiehl (December 2011 graduate) received the Delta Omega Academic Excellence Award for 2011-2012 by the Public Health Leadership Program. Kerry Garth (May 2012 graduate) passed the certification exam in public health, CPH. Linda Mensing and Dawn Mopkins, both current MPH students, passed the COHN-S exam.

▪ **Occupational Epidemiology (David Richardson, PhD)**

The Occupational Epidemiology program has been fortunate to have an exceptional group of highly productive graduate trainees that have been presenting at international conferences and collaborating with faculty on publications. For example, former trainee Kim Angelon Gaetz was a recent recipient of an ERC pilot grant, and now has completed collection of her dissertation data which focuses on respiratory health among North Carolina public school teachers. Over the last year she has received an EPA Star Fellowship (2011) and recently presented at the American Public Health Association Annual Meeting held in Washington DC (2011). Trainee Alex Kiel is developing a dissertation in the area of radiation epidemiology and presented his work at EPICOH (Epidemiology in Occupational Health) in Oxford, UK (2011). Former trainee Ghassan Hamra presented at the American Statistical Association Conference on Radiation and Health in Kennebunkport, ME, USA (2012) on his work on estimation of occupational tritium exposure health effects, and will be starting a post-doctoral traineeship at the International Agency for Research on Cancer where he will be working on the International Study of Nuclear Industry Workers.

Dr. Richardson, program director, began serving on the Scientific Advisory Committee for the Centre for Research in Environmental Epidemiology (CREAL) in Barcelona, Spain, as well as the Scientific Committee for the EPICOH annual conference (in 2013). He is currently serving on the National Academy of Sciences’ Institute of Medicine, Committee on Review of the Department of Labor’s Site Exposure Matrix Database (2011-present). In addition over the last year he served as Research fellow at the Institute for Radiological Protection and Nuclear Safety, Fontenay-aux-Roses, France (2012), and was co-author of the *Best paper in Biometrics*, 2011. He continues to serve on the Presidential Advisory Board on Radiation and Worker Health.

■ **Occupational Exposure Science (Leena Nylander-French, PhD)**

The Occupational Exposure Science (OES) Program is supporting three doctoral students during the academic year 2012-2013. The OES trainees have published 3 three scientific manuscripts and submitted 1 for publication as well as delivered 3 oral presentations in national and international scientific meetings in 2012. The OES faculty has published 23 scientific manuscripts, 1 book chapter, and delivered 6 oral presentations in national and international scientific meetings. Professor Nylander-French and former OES students Drs. Jennifer Thomasen and Kenneth Fent were awarded the Michigan Industrial Hygiene Society (MIHS) Best Paper Award 2011 for their publication entitled "Development of a Sampling Patch to Measure Dermal Exposures to Monomeric and Polymeric 1,6-Hexamethylene Diisocyanate: A Pilot Study" published in the Journal of Occupational and Environmental Hygiene.

Dr. Nylander-French received a R21 grant from NIOSH to investigate and identify individual genetic variations that modify biomarker levels in automotive spray-painters exposed to 1,6-hexamethylene diisocyanate. Professor Fry is a co-principal investigator in the newly renewed NIEHS supported training grant "Biostatistics for Research in Environmental Health," which provides support for pre-doctoral students and post-doctoral fellows in environmental sciences and biostatistics. The National Academy of Sciences/National Research Council has appointed Professor Fry to the Committee on Inorganic Arsenic and Professor Nylander-French to the Committee on Acute Exposure Guideline Levels.

■ **Continuing Education (Kathleen Buckheit, MPH, COHN-S/CM/SM, FAAOHN)**

Since 1976, the Continuing Education (CE) Program has provided quality opportunities for occupational safety and health professionals. Needs assessments, outreach, recruitment, and course evaluations indicate a substantial need exists. CE Program objectives measure success and are being met. Course evaluations confirm that courses are effectively and efficiently delivering the CE programs and services. Both academic and non-academic faculty, including experienced practitioners and consultants representing all occupational health and safety disciplines, offer a unique blend of theoretical and practical experience. All engage in outreach with professional associations, public agencies, and universities and participate as course directors, planners, presenters, evaluators, and technical advisors.

New courses are offered every year and many are in partnership with professional associations including South Eastern Atlantic College of Occupational and Environmental Medicine (SEACOEM), American, NC, and NC Tarheel Associations of Occupational Health Nurses (AAOHN, NCAOHN, NCTAOHN), Carolinas Section of the American Association of Industrial Hygienists (AIHA), and American Society for Safety Professionals (ASSE). NC OSHERC continues to collaborate with the Sunshine ERC at the UNC Annual Winter Institute in presenting the CAOHC Hearing Conservation Certification and Re-certification Courses and the USF OSHA Training Institute for Safety Courses. The third annual collaboration with the Sunshine and Deep South ERCs at the FL Workers Compensation Institute in Orlando, FL, presenting the R2P programs was held. EPA's Renovation, Repair, and Painting Certification Course is offered in both English and Spanish. Collaborative efforts are underway with the other ERC CE Programs to provide online training. The Fundamentals of Occupational Safety course is the priority for NC OSHERC as it can be used by trainees for the Safety Technician Certificate Program. The Technician Certificate Programs graduated another 18 students this year, making a total of 451 graduates of the Safety, Industrial Hygiene, and Environmental Technician Certificate Programs. One major new development is the Case Management Certification Review Course to be offered early 2013. All of our Certification Review Courses continue to yield very high national specialty Board examination pass rates.

Trainee recruitment, including diversity efforts, meets the training needs of the region. The geographic statistics indicated that 82% of the trainees were from the southeast region. For 2011-2012, the diversity breakdown of attendees reporting their ethnic background remained constant at: White - 82%; Black - 8%; Hispanic - 5%; Asian - 3%; American Indian - 2%. The CE Program trained 4,525 students (18% increase) in 152 courses (30% increase).

■ **Hazardous Substance Training - Program Directors: Nelson Couch, PhD and Kathleen Buckheit, MPH, COHN-S/CM/SM**

The NC OSHERC Hazardous Substance Training (HST) Program has been growing and expanding throughout the Southeast region. Kentucky and Tennessee have been the focus of training. The geographic statistics indicated that 85% of the trainees were from the southeast region. For 2011-2012, the diversity breakdown of attendees reporting their ethnic background remained constant at: White - 84%; Black - 10%; Hispanic - 3%, Asian - 2%, American Indian - 1%. The HST Program trained 818 students in 39 courses (18% increase). More than the \$10,000 from the NIOSH HST grant funding supported training of state and local government workers and several free courses were provided.

New and exciting opportunities are being developed in the NC OSHERC. Partnerships are increasing with Local Emergency Planning Committees, Hazardous Materials and Firefighters Associations, and Rapid Responders Team

(RRT). NC OSHERC is working on a Needs Assessment Program with the NC Department of Environment and Natural Resources (DENR) and is working to provide the Certified Hazardous Materials Manager (CHMM) Certification Review Course for them. NC state funds were significantly restricted and allowed state employees to participate in only free training programs that were offered. Efforts to market the Telecommunications HAZMAT Specialist Certificate Program to Sprint and Verizon continue.

Unfortunately, the NIEHS funding for the HST Programs provided through NIOSH was withdrawn from all ERCs after June 30, 2012. We will try to offer some of the HST courses as CE Programs, but can no longer offer the free courses provided by funding allocated in the HST grant.